

# AVIATION AND AERONAUTICAL ENGINEERING



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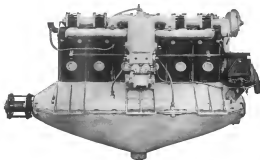
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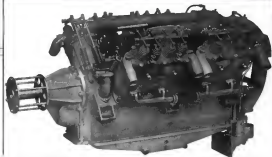
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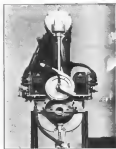
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AUGUST 1, 1917

# AVIATION AND AERONAUTICAL ENGINEERING

VOL. III. NO. 1

*Member of the Associated Business Papers*

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Vol. III

August 5, 1917

No. 1

WITH THE FIRST AMERICAN AIR ARMED WITH RE-ARMED, there is one more task to be done. It would be an impossible task to conduct in a short editorial, even the most important events which have occurred in aviation during the past twelve months.

A year ago, in this country, military and naval aviation was just beginning to be taken seriously. Congress had become convinced that the United States was one of the weakest powers in the world in this art, and that the attention to this important and in most respects, outmoded device, had been neglected. A staff was made up of representatives from the Army and Navy, which was soon disbanded. The second and more important, however, was the construction of air-planes and aircraft in the great small numbers and in the same or less concentration of time the Government and we have to rely entirely upon foreign orders to keep their business going.

The creation of an Aviation Section of the General Corps with Brigadier General D. S. S. as its head was also an important factor in the rapid development of military aviation in this country. Gen. S. S. has had the imagination to grasp the magnitude of the air forces which the country must have in order to play a successful part in the war, and to deliver the final blow to Germany through the air. To him, perhaps more than to any other man, is due the success of the program which has just been approved by Congress and the President. His earnest and convincing testimony before the Congressional committee holding hearings on the aviation bill did more, to enlighten and induce the members of the committee than any other single feature.

The Aircraft Production Board and its chairman, Harold E. Coffey, has also been of the greatest importance in the work of creating a favorable public sentiment and the importance of the work of this Board is mounting in part into the plan of the Chief Signal Officer cannot be overestimated.

In its statements to the public and to the effective and convincing publicity of the Act of Congress, the people of this country have been alerted to the needs of an adequate air force in the war.

The Navy with its naval policy of silence has prepared a program which will be a foundation for a great flying corps for some fifteen submarines, warships and aircraft. Many other statements have been selected and rapid progress is being made in covering the necessary knowledge and supplying flying equipment. Experimental work is also under way, which will produce types of airplanes particularly adapted to naval work.

The work of the officers of the Allied governments

now in this country should also be praised. These experts have done much more to assist in our work than will be realized until after the war is over. They came to this country armed with facts and figures, which were not where they would do the greatest good, and their sincerity and earnestness have impressed all with whom they have come into contact.

The airplane industry in this country has formed itself at last, it has organized and through the joint action and cooperation of the members has solved many of the difficult problems which have been obstacles in the past. The industry with a fair spirit has been meeting the new concerns which have been called on to aid in the production of airplanes and engines.

Congress in passing the \$640,000,000 aviation bill without prolonged debate, has rendered our allies a real service. Representatives and Senators have with a unanimity which is unique in the history of large appropriations, given their wholehearted support to the bill. The President signed it immediately, and Gen. S. S. and his staff now have available an adequate amount with which to make a beginning of peace with the United States with an air fleet worthy of the country.

## The Peace Situation Settled

The cross-breeding agreement which has been entered into by the aircraft manufacturers is a long step forward progress in clearing the way for rapid expansion and freedom of action. It is a matter of congratulation that litigation has been avoided at this time. The National Advisory Committee for Aeronautics, which has been instrumental in helping the adjustment of difficulties among patentees has done a remarkable piece of work very quickly. The effects of this settlement will also be to lead the aircraft manufacturers closer together, as the arrangement as made involves financial considerations which will eventually run into the millions. Now, any patentee with an improvement which is of value to the industry, can have his patent used and receive compensation therefor which will be just and equitable.

## The New Values

Despite the fact that the ownership of new and properly designed more and more strict, American and American Government believes that during the coming year the national infrastructure which it can supply to nations will be profited and helped. A mass of engineering data which has never been published and which can have an effect in a military or naval sense in becoming available and will be of the greatest use to engineers and designers.

Curtis



THE CURTIS NEW YORK COMPANY, NEW YORK, N. Y.

Master Aircraft Manufacturing Association, Inc.

Aviation Team Design Company, 110 Madison Ave., New York City, New York 1917.



The former set represents a manufacturing and maintenance within that an actual necessity and can accordingly be dispensed with, a small advantage being thus realized in weight and speed.

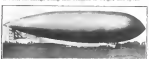


FIG. 2. HISPANIA F3, CREW SIX MEN

The characteristic feature of these surfaces is that they are not stiff and do not swing round as a rule, as is the case with all other rubber types, but are flexible, and have their front edge rigidly secured in the emergency gates the controlling means being attached to their rear edge.

When operated by the pilot and bent, these surfaces are rendered like airplane wings, the efficiency being very high with small bendings and still good with greater bendings.

The bending of these surfaces is always effected through the intermediary of an over-cable wire gear.



FIG. 4. A ROE VIREO, SIX MEN

These surfaces built up gates of shape and capacity are, therefore, going into to but a small amount of power (fuel) resistance.

The described arrangement of the steering gear also is a keeping low the total fuel resistance even when, in the first, suddenly against the operation of the surface is hindered.

#### Propelling Apparatus

The last arrangement that has designed appears to be that of the Hispania F3 now in process of construction. This dirigible is fitted with two engines arranged on the outer line of the air, each of them driving a propeller through a friction shaft and a set of wheel gears. The two sets being connected together in a gear box or in a frame, the motion of the two propellers is perfectly alike, and to enable both propellers to be driven by a single engine, or either propeller to be driven from the engine which is obviously intended for the other propeller.



FIG. 5. A ROE VIREO, SIX MEN

Close to each engine is arranged the corresponding radiator fitted with adjusting screws and directly coupled to the propeller the necessary air stream also for a controlled flow supplying

the engine, to prevent accumulation of gases. Each engine is also fitted with oil engine, exhaust center and exhaust.

When action of the engine is suddenly stopped, it can still be held by its means of power leading from the running engine. This arrangement facilitates starting, since the time which should otherwise be spent for running the engine up to full power, and avoids the danger of the water and oil freezing at the low temperatures obtaining at the higher altitudes.

In the "F3" describes the necessary apparatus such as an exhaust fan, lighting system, compressed air pump and anti-magnetic switch for the entire battery, are driven from a special shaft, the motion of which is conveyed by other engine without need of any interference by the pilot.



FIG. 6. THE A ROE VIREO, SIX MEN

The various well are supplied in the second group and are found in series in the construction of the dirigible, the construction of the propeller and for solution of the leading bearing device. The propeller supply is arranged so as to be free of direct action and velocity controllable in its movement.

Scrub Propellers with Adjustable Reversible Pitch

The first "F3" dirigible had fixed blade propellers with

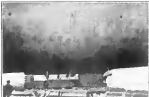


FIG. 7. A ROE VIREO, SIX MEN

large diameter and large pitch in use. These propellers showed a very high efficiency, but required a reversing gear for the emergency, near the ground, then also required shafts working at low speeds and very heavy. In order to comply with the general maneuvering requirements and reduce the air shaft's weight, metal propellers with adjustable reversible

pitch have been adopted in the latest types, like the propellers of the Army dirigibles M, F and V.

In the Hispania F3 the pitch of either propeller is adjusted separately, being in which the propellers can be used in addition to an emergency for the control surface, the maneuvering near the ground.

Upper Platforms with Shift and Ladder Connections with the Car

The reversibility of the dimensions of the "F3" dirigible enables a most convenient arrangement of the upper platform and the vertical shaft and ladder connecting the platform with the car. The ready assembly of the upper platform is considered by all experienced men a most good sign of an aircraft's military efficiency.

The upper platform is carried on rigid side bars to the two big horizontal bars of the gas envelope which are held fast by longitudinal partitions. The vertical rigidity is made



FIG. 8. ENVELOPE AND DIRIGIBLE—THE OTHER WIND IS CURRENT WIND

the platform (even when the actual velocity of the gas envelope platform is low) is lowered from its steady as it is moved on a rigid frame-work.

The intermediate facilitates the solution of the vertical shaft (or pit) with a ladder mode.



FIG. 9. CREEPING POWER IN PROGRESS OF INVESTIGATION



FIG. 10. THE CAR BEING FOR TRANSPORTING FROM THE HALLS

#### General Remarks

The figures in the attached table clearly show the progress that has been made by the Hispania's Leonardo Da Vinci in their numerous contributions and bear out the high quality of their more recent attempts, viz. the F3, whose construction advantages have been demonstrated by actual practice, and of F3 which is now in process of construction.

The following points are noteworthy:

- (1) In the construction of the dirigible and its components, the use of the most modern materials and methods is to be seen.
- (2) The dirigible is built up of a number of sections, which are joined together by a special method, and the whole is held together by a special method.
- (3) The dirigible is built up of a number of sections, which are joined together by a special method, and the whole is held together by a special method.
- (4) The dirigible is built up of a number of sections, which are joined together by a special method, and the whole is held together by a special method.
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- (9) The dirigible is built up of a number of sections, which are joined together by a special method, and the whole is held together by a special method.
- (10) The dirigible is built up of a number of sections, which are joined together by a special method, and the whole is held together by a special method.

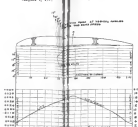
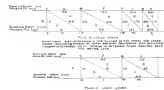
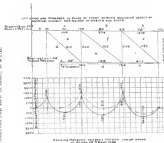
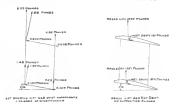
	F1	F2	F3	F4	F5	F6	F7	F8
Percent diseased	14	15	3	14	38	35	35	8
Percent between adjacent								
Plants	40	71	50	50	50	50	50	50
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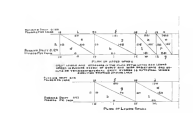
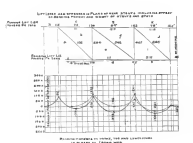
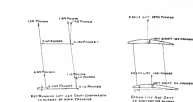








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4	10:00	1000	1000	1000	4	10:00	1000	1000	1000
5	10:00	1000	1000	1000	5	10:00	1000	1000	1000
6	10:00	1000	1000	1000	6	10:00	1000	1000	1000
7	10:00	1000	1000	1000	7	10:00	1000	1000	1000
8	10:00	1000	1000	1000	8	10:00	1000	1000	1000
9	10:00	1000	1000	1000	9	10:00	1000	1000	1000
10	10:00	1000	1000	1000	10	10:00	1000	1000	1000
11	10:00	1000	1000	1000	11	10:00	1000	1000	1000
12	10:00	1000	1000	1000	12	10:00	1000	1000	1000
13	10:00	1000	1000	1000	13	10:00	1000	1000	1000
14	10:00	1000	1000	1000	14	10:00	1000	1000	1000
15	10:00	1000	1000	1000	15	10:00	1000	1000	1000
16	10:00	1000	1000	1000	16	10:00	1000	1000	1000
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21	10:00	1000	1000	1000	21	10:00	1000	1000	1000
22	10:00	1000	1000	1000	22	10:00	1000	1000	1000
23	10:00	1000	1000	1000	23	10:00	1000	1000	1000
24	10:00	1000	1000	1000	24	10:00	1000	1000	1000
25	10:00	1000	1000	1000	25	10:00	1000	1000	1000
26	10:00	1000	1000	1000	26	10:00	1000	1000	1000
27	10:00	1000	1000	1000	27	10:00	1000	1000	1000
28	10:00	1000	1000	1000	28	10:00	1000	1000	1000
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### New Curtiss Flying Boat

The new Curtiss model H-5, a flying boat built for coast patrol work, had its trial flight July 24. Flashed by Harold Harrier, who Wallace Roper as passenger, the machine left Buffalo at 9:15 a. m., arrived at the Toledo Ohio, West Coast at 1:00 p. m. left Toledo at 5 o'clock and landed at the Detroit Motor Boat Club at 6 o'clock.

On the return trip the next day, in face of a heavy fog, which might have shown no sign that the pilot was compelled to return, the machine's American shore of the lake, and with an attempt to land, the machine, which left Detroit at 9:15 a. m., arrived at Toledo, on the outskirts of Toledo at 5:45 p. m.

The new model is powered with a 200 h. p. Curtiss engine, which worked perfectly on the trial flight.

### Manufacturer's Specifications

Curtiss, Indianapolis	19 1/2 ft. 6 in.
Wing span—upper plane	33 1/2 ft. 6 in.
Wing span—lower plane	24 1/2 ft. 6 in.
Wing surface—upper plane	550 sq. ft.
Wing surface—lower plane	350 sq. ft.
Wing surface—total	900 sq. ft.
Length of machine (overall)	35 1/2 ft. 6 in.
Length of fuselage (overall)	24 1/2 ft. 6 in.
Length of fuselage (usable)	20 ft.
Wing curve	R.A.P. No. 2

Wing, upper	618 sq. ft.
Wing, lower	350 sq. ft.
Wing, total	968 sq. ft.
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may attach. Stuart Olson, is appointed to meet in Washington at the call of the senior member for the purpose of establishing the organization of the aviation section of the United States army and navy.

A board of officers to consist of Maj. Gen. William Mitchell, aviation section, Signal Corps (ret. Major) H. Harrier, Major, Signal Corps, and Capt. Raymond Johnson, senior military aviator, Stuart Olson, is appointed to meet in Paris, France, at the call of the senior member for the purpose of establishing such officers as may appear before it to determine their fitness for service as junior military aviators.

### Prof. L. S. Marks to Have Charge of Kiggins Investigations

The National Advisory Committee for Aeronautics has just received by air in definite notice the services of Prof. L. S. Marks, head of the department of mechanical engineering of the University of Wisconsin, for the study of the problem of the stability of aircraft. He will be assigned to work in the special work of the subcommittee on flying machines and will have charge of certain investigations relating to airplane engine design and design of the committee at the Bureau of Standards.

Professor Marks is a recognized expert in aerodynamic, machine design and particularly the gas engine and is prob-

ably the best qualified man in the country to supervise the important investigations required.

### Army Wants Aviation Officers

It is desired to obtain as officers to the Aviation Section, Signal Corps of Military Engineers, qualified for training and commanding aviators from aviators candidates for this position should be from twenty-five to thirty-five years of age, should have a good education and be graduates of U. S. Naval Academy or equivalent. They should be well educated and have good judgment, and it is possible to obtain military experience.

It will be the intention to assign an aviator candidate to a school for periods of instruction of from three to four months. This course of instruction will cover some of the subjects, the design of aircraft, construction, photographs, etc., and such training.

Candidates who desire to make application for this position should write to Adj. General, Chief Signal Office, War Department, Washington, D. C., who will forward them the necessary information and blanks for making application to the War Department.

Candidates who complete the course successfully will be commissioned as First Lieutenants, and will be eligible to command. The pay carried by this commission will be \$2,000 per year with an increase of \$200 a year until it reaches the rate of \$3,000 per year.



THE COLLEGE BUILDING IN YORK, PAIDING FROM AIRCRAFT ATTEMPT TO FALL BACK



THE CURTIS AIRPLANE AND MOTOR CORPORATION, BUFFALO, N. Y.

Aviation Section, Signal Corps of Military Engineers, Buffalo, N. Y. American Trust Company Building, 200 Madison Ave., New York City, New York Office



**A practical quality oil for aeroplane motors**

**T**HE problem of aeroplane motor lubrication, resolved into its simplest terms, is this:

*"To lubricate an exceptionally fine motor operating continuously under maximum load."*

Hence, we have produced AEROL—not an oil of mystery—but a practical quality lubricant based on conditions to be met (except for rotary motors).

AEROL is, first of all, a very high grade oil, free from impurities.

Its lubricating values are very high, because it is an exceptionally good oil, made from a good crude to begin with, by a process developed through years of knowing how.

The drop in viscosity with the increase in heat is (relatively) unusually small. It is made in three grades of viscosity to meet the requirements of different types of motors.

AEROL is a practical oil because it is easily handled and flows easily. This feature is of practical utility where oil is drained off and cleaned out frequently. Also, where external feed systems are used.

Full details, characteristics and tests will be furnished to government officials, aeroplane manufacturers and others interested in the subject of aeroplane motor lubrication.

Technical and Research Department

**SWAN & FINCH**

COMPANY  
165 BROADWAY, NEW YORK  
Quality Oils Since 1855



# DYNAMIC BALANCE

## for crankshafts, etc.

Send for pamphlet describing my latest *Dynamic Balancing Apparatus*

## MODEL 1917

It is just as scientific as was my last year's model (*not now made by me*), although entirely different in principle and construction, much cheaper and yielding still better results.

**No Agents, Representatives or Licencees!**

Made and Distributed EXCLUSIVELY by

**N. W. AKIMOFF, Harrison Building, Philadelphia**

(Organizer of the Dynamic Balancing Machine well known by his name.)



## What Would You Think of a Manufacturer—

—who wrote to you with a stub pencil—  
"We are saving much money, because we do not use typewriters and telephones"? You might well wonder whether his merchandise was as much out of date as his business methods.

You know that modern time and labor saving appliances are not added expenses, but that they have superseded slower and more costly processes.

The concern that uses your business paper to tell you its business story is simply making it easier for you to buy intelligently with the least waste of time on your part and theirs.

For the right kind of advertising shortens the distance between human minds just as certainly as the railroad has shortened the distance between places. It is still possible to walk from New York to Chicago, and it is still possible for a business to get along without advertising. BUT—

—don't forget that the seller who does not advertise, is not only paying for the results that such advertising would get him, but he is also paying more than necessary.

Progressive advertisers are progressive merchandisers and it pays to do business with them.

### THE ASSOCIATED BUSINESS PAPERS, INC.

*The International Association of Trade, Technical and Class Publications*

ALL OF WHICH HAVE SUBSCRIBED TO THE "STANDARDS OF PRACTICE"

Advertising & Selling  
American Architect  
American Blacksmith  
American Exporter  
American Farmer  
American Mechanic  
American Paint & Oil Dealer  
American Printer  
American School Board Journal  
Architectural Record  
Automobile Dealer & Repairer  
Automobile, The  
Band & Sheet Recorder  
Bank & City Record  
Buildings & Building Management  
Bulletin of Pharmacy  
Canadian Engineer  
Canadian Railway & Marine World  
Cement World  
Clothing & Fashioner  
Coal Age  
Concrete  
Dynamo Engineering  
Dry Goods Journal  
Dry Goods Economist

Dry Goods Reporter  
Editor & Publisher  
Electrical Railway Journal  
Electrical Review & Western Electrician  
Electrical World  
Electric Traction  
Engineering & Mining Journal  
Engineering News-Record  
Farm Machinery—Farm Power  
Furniture Manufacturer & Artisan  
Good Things Furniture Record  
Hatchery, The  
Hardware Age  
Hike & Lumber  
Hike Monthly  
Illustrated Milliner  
Insulation Age  
Industrial Arts Magazine  
Inland Printer  
Iron Age  
International Trade  
Lumber Trade Journal  
Lumber World Review  
Manufacturing Record  
Manufacturing Jeweler

Marine Engineering  
Metal Worker, Plumber & Steam Fitter  
Metalworker & Chemical Days  
Modern Electrician  
Motor Age  
Motor World  
National Builder  
National Electrical  
National Provision News  
Paper  
Practical Engineer  
Railway Age Current  
Railway Electrical Engineer  
Railway Maintenance Engineer  
Railway Mechanical Engineer  
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Shoe & Leather Reporter  
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HEADQUARTERS: 220 West 42nd Street, NEW YORK CITY

Information concerning Business Papers cheerfully supplied



## RESISTAL AVIATOR'S GOGGLES

### Unbreakable

Resistal goggles are equipped with unbreakable lenses. No glass will fly from Resistal lenses from a blow sufficient to shatter an ordinary lens.

These lenses are made of a layer of transparent celluloid welded under enormous pressure between two layers of the finest glass, giving 97.64% of transparency and at the same time subduing some of the glare.

Resistal lenses are bent for side vision, increasing the range of sight of the wearer.

As the layer of celluloid acts also as an insulator, vapor will not gather on Resistal lenses.

### Water-proof

No adhesive cement is used in their construction, with the result that water has absolutely no effect on Resistal lenses.

Tested Resistal lenses have been subjected to the most rigid tests, and comply fully with the regulations of the Army and Navy.

Prompt Delivery can be had in any quantity. Write us direct for full information and prices.

**Strauss & Buegeleisen**  
37 Warren Street N. Y. C.

### Bent for Side Vision





## GRAND RAPIDS LUMBER TESTER



KNOW THE MOISTURE CONTENT OF YOUR LUMBER

DIRECT READING—NO COMPUTATION—NO CONSUMPTION  
All selected lumber for AIRPLANES should be tested to insure uniformity.

Lumber should season from 3 to 10 per year, according to manufacturing purposes, according to kind of work.

Lumber containing too much moisture shrinks from the air and warps.

Lumber containing more will swell the surfaces and split.

Customers of the Grand Rapids Lumber Tester are found in "base dry" as compared with the U. S. Forest Laboratory at Madison, Wisconsin.

**GRAND RAPIDS VAPOR KILN**  
Manufactured by GRAND RAPIDS VEEBEE WORKS  
Grand Rapids, Mich.      Seattle, Wash.

## THE STANDARD CLOCKS

FOR USE ON  
AEROPLANES and  
SEAPLANES &c.

The Justly Celebrated  
8 DAY—HIGH GRADE

### "CHELSEA"

CORRESPONDENCE SOLICITED

**CHELSEA CLOCK CO.**  
10 State Street, Boston, Mass., U.S.A.

## IN ACTUAL DAILY PERFORMANCE

In every branch of military service—Engineering Corps, Aviation Section, Quartermaster Corps, and general Patrol, Scout, and Dispatch duty—you will find the 1917

### Indian Motorcycle With Powerplus Motor

Greatest strength, endurance, speed, power, accessibility, and absolute dependability.  
We will be pleased to arrange demonstrations of all 1917 Indian models for interested military schools.

Illustrated 1917 Indian Catalog and other descriptive literature and literature on request.  
**HENDIE MANUFACTURING COMPANY**  
Largest Motorcycle Manufacturers in the World  
424 STATE ST.      WINDSOR, MASSACHUSETTS



## Sturtevant

### Aeroplane Company

Jamaica Plain      Boston

Member Aircraft Manufacturers' Association



Aviation Barometers Equipped With  
**MARVELITE**  
self-luminous Radium compound of quality

are proving so useful and so entirely satisfactory that our manufacturers can longer afford to delay investigating the merits of this remarkable new material. Our experience is such, our samples furnished and our reasonable demonstrations gladly made for orders of barometers, compasses, dials, clocks and watches.

**COLD LIGHT MFG. COMPANY**  
DENVER, COLORADO



"Plus" Auto Type  
Used by the U. S. Government

Having just completed large orders for the Allies we are in better position than ever to take care of our trade.  
**AUTO RADIATOR MFG. CO.**  
210-212 W. 21st STREET.      LOS ANGELES, CAL.

## Aeroplane Lumber Specialists

Alaska Spruce  
Black Walnut  
Tough White Ash

**CHETHAM LUMBER CO., Inc.**  
15 William Street      New York

Telephone, BRONX 1021

## Heavy Elastic Aviation Cord

We manufacture a full and complete line of heavy elastic aviation cord. We are the originators and the largest manufacturers in the world of heavy elastic cord.



Standard 3/4" equipped with one end

**J. W. WOOD ELASTIC WEB CO.**  
STOUGHTON, MASS.

## AIRPLANE SPRUCE

*WE HAVE*

### SILVER SPRUCE PACIFIC SPRUCE

GRADED AND INSPECTED BY  
PACIFIC LUMBER INSPECTION  
BUREAU, INC. AND

### WEST VIRGINIA SPRUCE

OF THE MANUFACTURERS  
GRADING RULES. WRITE FOR  
SPECIFICATIONS AND PRICES

**JOHN L. ALCOCK & CO.**  
BALTIMORE, MD.

## "DALTON SIX"



In the Manufacture  
of Aeroplanes or the  
many small parts  
comprising a Unit  
"Dalton Six"  
is indispensable.

Furnished for  
English or Metric  
Thread Cutting.

One Manufacturer  
of fine instruments  
for aeroplanes now  
has

**(36) "DALTON SIXES" Installed**

*Why Not Investigate?*

(BULLETIN 6423C GIVES DETAILS)

**Dalton Manufacturing Corp.**  
Successors to Dalton Mosh. Co., Inc.  
1911 Park Avenue New York, U. S. A.

## Radiators

**WE** have learned some  
valuable lessons in our  
ten years of radiator  
manufacture.

We have had the valued help  
of Yale Sheffield Technical De-  
partment in many ways.

What the past ten years has  
taught us is at your command.

We want to build the best  
radiators made. We never  
manufacture down to price.  
Quality comes first.

Maximum efficiency with  
minimum weight.

Your prints are solicited.

**The English & Mersick Co.**  
New Haven, Conn.

## "Usco" NUMBER 72

THE STANDARD  
KITE BALLOON FABRIC  
OF AMERICA

A TWO-PLY BIASED FABRIC,  
COATED BETWEEN PLYS  
WITH A LIGHT, TOUGH  
LAYER OF PURE PARA RUB-  
BER.

THIS FABRIC HAS BEEN DE-  
VELOPED FROM YEARS OF  
LABORATORY EXPERIENCE,  
AND POSSESSES EVERY FEAT-  
URE AND QUALIFICATION  
NECESSARY TO A WELL-BAL-  
ANCED PRODUCT, VIZ:

**STRONG  
GAS-TIGHT  
NEUTRAL, INVISIBLE COLOR  
WITHSTANDS ALL WEATHER  
CONDITIONS  
AND AGES WELL**



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